

Lethal overdoses caused by psychoactive substances use in France

This issue of *Tendances* describes the various sources of information on drug overdose deaths and how such deaths have evolved over time.

Éric
Janssen

Christophe
Palle

The use of some drugs at certain doses can cause immediate or imminent death: this is what we call drug overdose death (see box below), which tends to affect relatively young people. A major objective of the policy of drug authorities in France and elsewhere is to reduce the number of these drug-related accidents that have dramatic consequences. This is why the data on drug overdose deaths constitute one of the five key indicators¹ adopted by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA).

The question thus arises of how to define these overdoses and which causes of death to consider. In France, there are currently several sources of data that are built upon varying definitions. This issue also exists on a European level, since each country has adopted their own, specific modalities for registering these deaths. Therefore, the EMCDDA has committed itself to establishing a common protocol to be used by all members of the European Union (see box on the following page).

It seems necessary to describe these different sources in order to understand their scope and limitations, as well as to formulate the clearest view possible of the trends observed in drug overdose deaths according to these different information systems. Studying these data will also help suggest steps to take towards improving the situation in the future.

Définition - Drug overdose deaths are defined as deaths directly caused by the ingestion of one or more substances. Although such deaths are generally associated with the use of illicit substances, drug overdose deaths also involve legal products, such as Opioid Substitution Treatments (OSTs), i.e., methadone and High Dose Buprenorphine (HDB), as well as certain medications (morphine sulphates).

Three sources of information on drug overdoses

Three sources of information on deaths related to drug use exist in France: the database of medical causes of death maintained by the Centre d'épidémiologie sur les causes médicales de décès (CépiDc, or the Centre for epidemiology of the medical causes of death, which is part of the INSERM - the National Institute for Health and Medical Research), the registry from the Office central de répression du trafic illicite des stupéfiants (OCR-TIS, or the Central Office for the Repression of Illicit Drug Trafficking), and the registry of Décès en relation avec l'abus de médicaments et de substances (DRAMES or Deaths involving abuse of medicines and substances) of the Agence française de sécurité sanitaire des produits de santé (AFSSAPS or the French Health Products Safety Agency).

The CépiDc database is built on processing certificates sent by the physician who declared the death (see box on page 2). When narcotic use is suspected to be the cause of death, the physician responsible for declaring the death does not fill in the certificate they return to the CépiDc. The death is temporarily coded in the certificate as having "unknown or poorly defined causes" until the results of legal investigations have been published. A preliminary legal investigation is opened and the file is sent to the office of the public prosecutor, who can order toxicological analyses to be performed. The results are then retrieved by the CépiDc, which uses them to update its database. The CépiDc data are theoretically the most complete. Limitations are related to the relatively long time to publication and to the number of drug overdose deaths classified as having "unknown or poorly defined causes". Furthermore, the substances in question are not always provided.

In the '90s, only deaths caused by drug dependence, as defined in the 9th International Classification of Diseases, were considered to be overdoses [1]. In the 10th ICD, which has

1. These five indicators cover surveys of the general public, problematic drug use, treatment request indicators, mortality related to drug use and infectious diseases related to drug use.

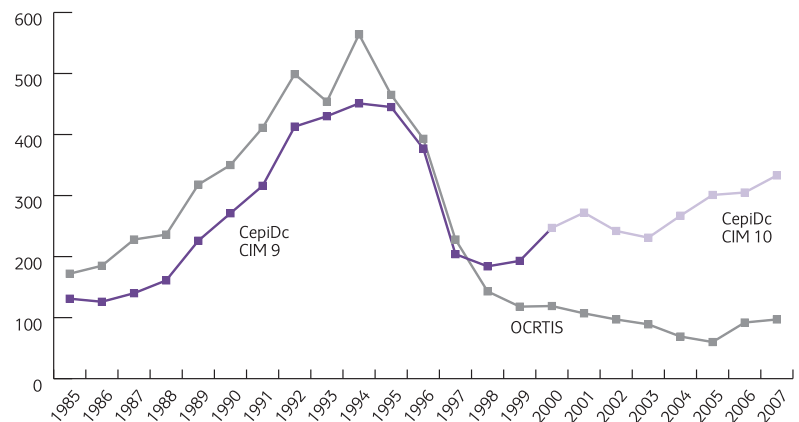
been in use since the year 2000, the underlying cause of death that was about the same as the 9th classification was defined as "Mental and behavioural disorders due to psychoactive substance use". The notion of behavioural disorders indicates that such deaths are not due to accidental intoxication, but rather fall within the scope of an addiction. It is possible that there is insufficient information to determine whether or not the deceased regularly used narcotics. The boundaries between addictive behaviours, accidents and suicides are often difficult to distinguish. For these reasons, the EMCDDA has chosen a wider definition of deaths related to drug use.

The DRAMES database is updated each year with information from toxicology laboratories and Centres d'évaluation et d'information sur la pharmacodépendance (CEIP - Drug Dependency Information/Evaluation Centres). The primary purpose of the database is not to provide an exhaustive list of the number of fatal overdoses; rather, it is to monitor the types of substances found, paying particular attention to medications. The accepted definition is similar to the EMCDDA's Selection B, but it includes certain deaths indirectly related to the use of substances, like falls and drowning. Despite the increasing number of participating laboratories, this system does not provide complete geographic coverage of the territory.

The OCRTIS registry collects information on overdose deaths reported by the National Police and the Gendarmerie. The OCRTIS classifies as an overdose death any death apparently caused by the use of at least one narcotic or one opiate medication based on evidence at the scene that indicates the substance use. Some substances are more difficult to detect and overdose cases are not automatically referred to the centralised OCRTIS department; therefore, registering deaths with the OCRTIS is not systematic like it is with the CépiDc, and it is not based on any toxicological analyses. Following the differences observed in comparison to the two other databases, since 2008 the OCRTIS has stopped providing overdose death breakdowns performed by the police.

Death certificate - All deaths in France are reported in a medical declaration that is transcribed in the form of a death certificate. This certificate has two parts: the first part specifies names and is sent to the INSEE (the French National Institute of Statistics and Economic Studies) to update the *Registre national des individus et personnes physiques* (RNIPP - National Registry of Persons). The RNIPP provides information on the vital status of individuals in France. The second, anonymous part of the certificate is sent to the CépiDc and contains all of the medical causes of the death in question, from the underlying cause to the immediate cause, as well as the information pertaining to the deceased: age, sex, marital status, professional status, and place of residence. The causes are coded according to the criteria of the International Classification of Diseases (ICD, 10th Version) that has been used in France since 2000. The statistics published by CépiDc refer to the underlying causes of death².

Figure 1 - Fatal overdoses in France according to CépiDc and OCRTIS, 1985-2007



Sources : CépiDc, OCRTIS

Trends and substances

Figure 1 groups the overdoses registered since 1985 by OCRTIS and CépiDc (based on the Selection B criteria and both applied versions of the International Classification of Diseases). The DRAMES data are not presented here, since the number of centres that participated in the data collection varied throughout the period.

From 1985 to 1998, both sources of data evolved in a nearly identical fashion; the CépiDc curve is situated below the OCRTIS curve until 1994, most likely due to overdose deaths that were classified as having unknown causes. After the peak in the mid-'90s, the number of overdose deaths dropped sharply until 1998 for both data sources. This drop occurred within the context of the adoption of the harm reduction policy and the rapid distribution of opiate substitution treatments in France.

The CépiDc and OCRTIS data diverge from 1999 to 2005; CépiDc data showed a significant increase for this period, while the OCRTIS data continued to decline until 2005. In 2007, this discrepancy was due to the fact that CépiDc recorded three times more deaths. Several reasons can explain the difference between these two curves as of 1999/2000. First, we notice an increase in the proportion of accidental overdose deaths and suicides, which represented less than 10% of all deaths in 1994 and 35 - 40% of all deaths in the 2000s. This change is accompanied by an increase in the proportion of deaths occurring after the age of 64. People in this age range are rarely seen among active drug users, and we can assume that these deaths are related to the use of opiate medications as painkiller treatment; these medications have been more frequently prescribed in the past few years. For this reason, the figures in table 1 were calculated by excluding people who were over the age of 64 at the time of death. However, it is also possible that, like in the United States, the misuse of these medications by people who are less identifiable as "drug addicts" leads to more overdose deaths being classified as accidental or suicides.

The changes that have taken place since the '90s (distribution of substitution therapies,

The EMCDDA definition - the EMCDDA

suggests a definition for overdose deaths that is free from the difficulties related to the national definitions: the Selection B definition [2, 3]. It is applied to the data in the mortality registries and is based on a selection of causes coded according to the 9th or 10th version of the International Classification of Diseases (ICD). The deaths used for this definition are those directly caused by:

1. "Mental and behavioural disorders due to use of psychoactive substances", with the exception of deaths caused by tobacco, alcohol and legal substances, so that only deaths caused by opioids (code F11), cannabis (code F12), cocaine (code F14), other stimulants (code F15), hallucinogens (code F16) and other psychoactive substances (F19) are included. The latter code comprises deaths caused by the use of multiple substances (or polydrug use). The F codes are associated with drug dependence and drug abuse.

2. "Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens]" (code X42). These are overdoses that are classified as accidental.

3. "Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens]" (code X62). These are overdoses that are classified as suicides.

4. "Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], undetermined intent" (code Y12).

5. Finally, code X41 (Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs), code X61 (Intentional self-poisoning) and code Y11 (Poisoning, undetermined intent) are crossed with code T40 (Poisoning by narcotics and psychodysleptics [hallucinogens] excluding the drug dependence and mental and behavioural disorders discussed in point 1). These codes are very rarely used in France.

2. The underlying cause of death is defined by the WHO as "a) the disease or injury which initiated the sequence of events leading directly to death, or b) the circumstances of the accident or violence which produced the fatal injury". Therefore, the underlying cause of death must be treated to prevent the death. This is the cause that will mainly be used to present the medical statistics on mortality.

Table 1 - Breakdown in France by % of overdose deaths according to the type of substance (in people aged 15-64)

ICD 10 Codes	2000	2001	2002	2003	2004	2005	2006	2007
F11 - use of opioids	8.4	7.8	10.2	8.0	13.8	8.3	11.3	11.1
F12 - use of cannabinoids	0.0	0.0	0.0	0.9	0.8	0.4	1.1	0.3
F14 - use of cocaine	0.9	0.8	1.3	0.9	2.5	1.9	1.8	1.0
F15 - use of other stimulants	0.0	0.8	1.3	1.4	0.8	0.4	1.5	0.0
F19 - overdoses due to multiple drug use	49.8	49.8	47.1	54.7	48.5	50.8	50.2	53.0
X42 - accidental overdose	18.6	25.5	31.1	27.4	24.7	33.7	27.6	28.9
X62 - suicide by overdose	10.2	5.3	4.9	6.6	8.4	4.5	6.5	5.6
Y12 - overdose undetermined intent	12.0	9.9	4.0	0.0	0.4	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	225	243	225	212	239	264	275	287

Source : CépiDc

decrease in intravenous drug use) have contributed to making the identification of drug use in overdose deaths more difficult for the National Police and the Gendarmerie. Moreover, using local services to transfer information on death cases to the OCRTIS may have proven to be less effective in the 2000s.

In summary, the CépiDc data seemingly overestimate the number of overdoses by including accidental deaths and suicides unrelated to the "abuse" of a drug. The rebound in the curve from 1998 to 2001 is undoubtedly

a direct consequence of this. Even if it is exaggerated, the upward trend starting in 2003 is not, however, due to artefact. This overestimation is probably offset by the deaths classified as having unknown causes which should have been counted as overdoses. As for the OCRTIS data, they underestimate the number of overdose deaths.

As shown in table 1, the majority of deaths due to behavioural disorders are classified as being due to multiple drug use. This reflects both the method of use prevailing among drug users and the difficulty in accurately identifying the products from death certificates. Overdose deaths due only to opioids hover at around 10% of all overdose deaths, but this category of substance is also involved in a large number of deaths due to multiple drug use. With the exception of the proportion represented by accidental overdoses (code X42), which more or less follows the general trend from 2000 to 2007, the increase in the number of overdoses observed in the CépiDc data from 2003 to 2007 cannot be explained by a

variation of any particular category of death. The breakdown remained more or less the same for this period: no single category increased faster than the others. The number of fatal overdoses recorded since 2000 by the three sources are presented in table 2.

The increased number of forensic organisations and laboratories taking part in the data collection campaign explains the rise in the number of overdoses reported in 2006 by the DRAMES data. This number has remained generally constant since this date, leading us to conclude that there was an upward surge in the number of deaths by overdose between 2006 and 2008. DRAMES also supplies valuable information concerning the drugs used, insofar as this is based entirely on the results of toxicological analyses. In 2008, illegal substances were involved, as the main substance, in just over half of the cases (52%), while a substitution treatment was the main substance in almost 39% of cases, and this was the case for an opioid medication (non-substitution) in almost 9% of cases. Overall, opioids are chiefly involved in 84% of cases and cocaine (alone or combined with other products) in approximately 14%. Between 2006 and 2008, the increasing number of overdoses is explained by the rising number of deaths due to overdoses of heroin (+20 cases) and methadone (+32 cases).

The increase in the number of overdose deaths in the second half of the 2000s is confirmed by all three sources. It can be explained by the appearance of new users who are young and not well known by treatment centres [4]: their limited experience combined with their lack of knowledge of the substances and their methods of use tend to result in higher-risk behaviour. The growing use of cocaine and other stimulants since the early 2000s in addition to the increased availability of heroin (whose retail price has fallen, and whose reputation today is somewhat less negative among users than was the case a decade ago) are further explanations for this trend.

Profile of people who died by overdose in France, 2000 to 2007

The profile of people who died as a result of an overdose is established based on the CépiDc data by applying the Selection B definition to 15 to 64 year-olds. Fatal overdoses tend to be a masculine phenomenon, with a sex ratio of around five (this ratio is approximately 4 for users receiving treatment). The proportion represented by women has diminished over the past eight years, declining from 19% in 2000 to 15% in 2007. The average age of death was higher among women (36.8 years old) than among men (33.4 years old). The differences between the sexes are illustrated in the types of substances that led to death: among the men, two-thirds of the deaths arose as a result of behavioural problems related to the use of multiple drugs. Among the women, the percentage of such deaths only accounts for half of the total, and

Table 2 - Deaths by overdose in France according to three sources

Année	OCRTIS	CépiDc (EMCDDA definition, selection B)		DRAMES
		All	15-64 y.o.	
2000	120	248	225	101
2001	107	274	243	nd
2002	97	244	225	74
2003	89	233	212	64
2004	69	268	239	86
2005	57	303	264	68
2006	nd	305	275	168
2007	93	333	287	192
2008	nd	nd	nd	217

N. av. : non available.

Sources : OCRTIS, DRAMES, CépiDc, various reports

Table 3 - The main substances involved in overdose deaths in 2007-2008 (DRAMES data)

	2006		2007		2008	
	Number	%	Number	%	Number	%
Heroin alone or combined with other substances	59	35.1	69	35.9	79	36.4
Cocaine alone or combined with other substances	31	18.5	39	20.3	30	13.8
Other illegal substances (alone or in combination)	5	3.0	2	1.0	4	1.8
Methadone alone or combined with other substances	31	18.5	61	31.8	63	29.0
Buprenorphine alone or combined with other substances	20	11.9	11	5.7	21	9.7
Other opioid medicines, alone or combined	18	10.7	10	5.2	19	8.8
Others	4	2.4	0	0.0	1	0.5
Total	168	100.0	192	100.0	217	100.0
Number of participating departments		16		18		19

Source : AFSSAPS. Only deaths directly caused by drug use are mentioned.

the percentage of accidental overdoses or suicides was higher.

A little more than half (52%) of users were unemployed at the time of their death, while 43% had a job and the situation of the remaining 5% was unknown. The people who died were of modest socioeconomic status: among those whose employment status was known, more than half were manual labourers (53%) and more than a third were salaried employees or employed as technicians, supervisors, or in similar jobs (36%), followed by self-employed professionals and executive staff (6%), craftsmen and shopkeepers (5%) and farmers (1%).

Of the deaths recorded over the eight-year period under consideration, nearly 47% were concentrated in three geographic areas: 18.7% of the deaths were in the Paris metropolitan area alone; this is the most populated area of France, and is characterised by high narcotics demand. It represents France's main narcotic market, and is followed by the Southeast of France (15.6% of the deaths - drug traffic comes from the Southern countries, especially by sea) and the North of France (12.6% - a transit zone for certain drug trafficking activities, especially with regard to opiates). A second group of regions contains Alsace-Lorraine (9.5%), the Rhône-Alpes (7%) and Brittany (6%). The remaining 30% of deaths occur uniformly throughout the other regions of France.

Comparisons between France and its major neighbours

According to the official data from neighbouring countries, France is in a favourable position. The number of overdoses in France (defined according to the EMCDDA Selection B criteria, and without any age limits) is four to five times lower than in Germany, and six to seven times lower than in the United Kingdom. It was not possible to find data compliant with the European protocol for Italy for the same period. According to the statistics established by the Italian police, which are probably comparable to the data of the OCRTIS, the number of overdose deaths in 2005 was 603.

The first explanation for this difference is related to a French specificity regarding substitution therapy. France is currently the only country that has decided to authorise all general practitioners to prescribe HDB, since it is not as dangerous due to a "ceiling effect" that protects against overdose. In France, approximately 75% of individuals receiving opiate substitution treatment are prescribed HDB. In Germany and in the United Kingdom, the majority of substitution treatment prescriptions are written for methadone. Methadone is prescribed three times less often than HDB in France - a fact that led to three times fewer deaths in 2008 according to the DRAMES data. Using HDB can partially explain this lower mortality in comparison to the two aforementioned neighbours.

A second explanation is the underestimation of this figure. A study conducted in the Paris metropolitan area in the early 90s con-

cluded that a majority of the results of the toxicological analyses of fatal overdoses were not transmitted to the CépiDc [1], thereby biasing the official estimates. Lepère et al. [5] evaluated the underestimation in the 90's to be in the order of 10 to 20 %. Cross-checking the information on the overdoses registered in 2001 and 2002 by the CépiDc and the OCRTIS led to a double conclusion: the number of overdoses is underestimated by a bit more than 30%, but even considering this, the corrected level remains below the estimations made for Germany and the United Kingdom. The preliminary results of cross-checking the three sources for 2007 confirm these conclusions.

Conclusion and discussion

Between the late 80s and the late 90s, France experienced a rapid surge in the number of overdose deaths followed by a sharp reduction. The evolution in the early 2000s became rather difficult to interpret due to the changes in statistical nomenclature and a possible increase in deaths by accidental overdose. Since 2003, we have witnessed a new rise according to the different services responsible for recording these deaths. The DRAMES data demonstrate that, from 2006 to 2008, there was an increase in deaths related to the use of opiates, heroin in particular, and methadone. In addition to the increased availability of heroin, the appearance of new types of users who are less conscious of the risks to which they are exposed partially explains this increase. The data available do not provide a more detailed explanation for this evolution from 2003 to 2007.

The number of fatal overdoses in France appears to be lower compared to other European countries. France's preference for HDB and its less restrictive prescription conditions probably partially explain this difference. The lack of cross-checking between the different sources gives the impression that there is a rather significant underestimation of the number of overdoses in France, which remains lower than the levels observed in the United Kingdom and in Germany. Improving the information system for overdose deaths is an issue that goes beyond the simple question of public health in France; it also concerns meeting the demands of European institutions. There are several possibilities: automatically transmitting the overdoses observed by the police to the centralised OCRTIS services is one way to obtain more complete information. Then, it is advisable to resolve the problem of non-transmission or late transmission of the results of certain forensic organisations to the CépiDc in order to eliminate the overdose deaths classified as cause unknown. This problem has been raised for many years, and there have been no solutions. Generalising the online entry of death certificates would more rapidly provide data to the CépiDc. Having additional institutions take part would provide the DRAMES system, whose data are also transmitted to the EMCDDA, with exhaustive results.

Bibliographic references

1. LECOMTE D., et al., « Décès par usage de stupéfiants en Ile-de-France », *BEH - Bulletin épidémiologique hebdomadaire*, Vol.35, 1994, p. 159-161.
2. EMCDDA, The DRD-standard, version 3.0. *EMCDDA standard protocol for the EU member States to collect data and report figures for the key indicator Drug-Related Deaths by the Standard Reitox tables*, Lisbon, EMCDDA, 2002.
3. EMCDDA, *An overview of the drug-related deaths and mortality among drug users (DRD) key indicator*, Lisbon, EMCDDA, 2009, 10 pages.
4. CADET-TAÏROU A., et al., *Drogues et usages de drogues en France. État des lieux et tendances récentes 2007-2009. Neuvième édition du rapport national du dispositif TREND*, Saint-Denis, OFDT, 2010, 280 pages.
5. LEPÈRE B., et al., « Diminution du nombre de surdoses mortelles à l'héroïne, en France, depuis 1994. À propos du rôle des traitements de substitution », *Annales de Médecine Interne*, Vol.152 n° suppl. au n° 3, 2001, p. 1S5-1S12.

Tendances

Chief Editor
Jean-Michel Costes

Editorial Committee
Catherine Berthier, Sylvain Dally,
Alain Epelboin, Serge Karsenty, Maria Melchior

Editorial Secretary
Julie-Émilie Adès

Graphic Designer
Frédérique Million

Printing
Imprimerie Masson / 69, rue de Chabrol
75010 Paris
ISSN 1295-6910
Legal publication registration

French Monitoring Centre for Drugs
and Drug Addictions
3, avenue du Stade de France
93218 Saint-Denis La Plaine cedex
France
Tél : 33+(0)1 41 62 77 16
Fax : 33+(0)1 41 62 77 00
e-mail : ofdt@ofdt.fr

www.ofdt.fr

